Pilot study

The aim of this pilot study was to replicate the suppression-induced forgetting effect using the TNT paradigm before screening for OCD and PTSD traits and test the hypothesis that the No-Think manipulation would result in a significantly lower recall of words than baseline at final test indicating suppression-induced forgetting effect (Hypothesis-P1). Conversely, the Think manipulation would produce higher recall of words at final test than baseline indicating facilitation effects (Hypothesis-P2). To prevent effects of confounds, any such replication would need very close adherence to the TNT protocol devised by Anderson (Nardo & Anderson, 2024).

Independent behavioural studies, conducted by researchers unassociated with Anderson, reported failed replications of the No-Think suppression effect with a frequency of No-Think suppression trials smaller than 16 (e.g., 12) (Hertel & Calcaterra, 2005; Hertel & Mahan, 2008) as well as with 16 trials (Bulevich et al., 2006; Wessel et al., 2020). In addition to fewer No-Think suppression trials, these unsuccessful replications could be due to a variety of reasons, such as sleep deprivation, neglecting experimental instructions, length of trials, fatigue, etc. (Anderson & Huddleston, 2012; Harrington et al., 2021; Liu et al., 2021; Schie & Anderson, 2017). Hence, this does not necessarily indicate that the TNT paradigm cannot be independently replicated. The pilot study had a similar design and procedure as the main study mentioned in this article. Recall was tested with both SCT and ICT.

Method

Participants

Forty students from an undergraduate psychology course at University of Canterbury participated for 4% course credit. Ages ranged from 18 to 44 years old (M = 22.45, SD = 6.88). Of these, 31 (77%) were female and 9 (22%) were male. Sixteen participants (40%) were

excluded due to inability to recall at least 50% of responses in the criterion test during Phase 1 of the experiment. The rest of the analysis was based on the 24 participants who successfully completed the experiment. Participants were recruited by advertising and volunteered to participate. Exclusion criteria were an ADHD diagnosis and/or colour blindness. No participants were excluded due to required sleep criteria (at least 7 hours the night before testing) or deliberate attempts of deception (as explained in the main paper's Method section). The study was approved by the Human Ethics Committee of the University of Canterbury (HEC 2019/41/LR-PS). The experimental procedure was similar with the main study, except that the participants were not screened for YBOCS or PCLC. However, their scores on these traits were obtained following the TNT experiment.

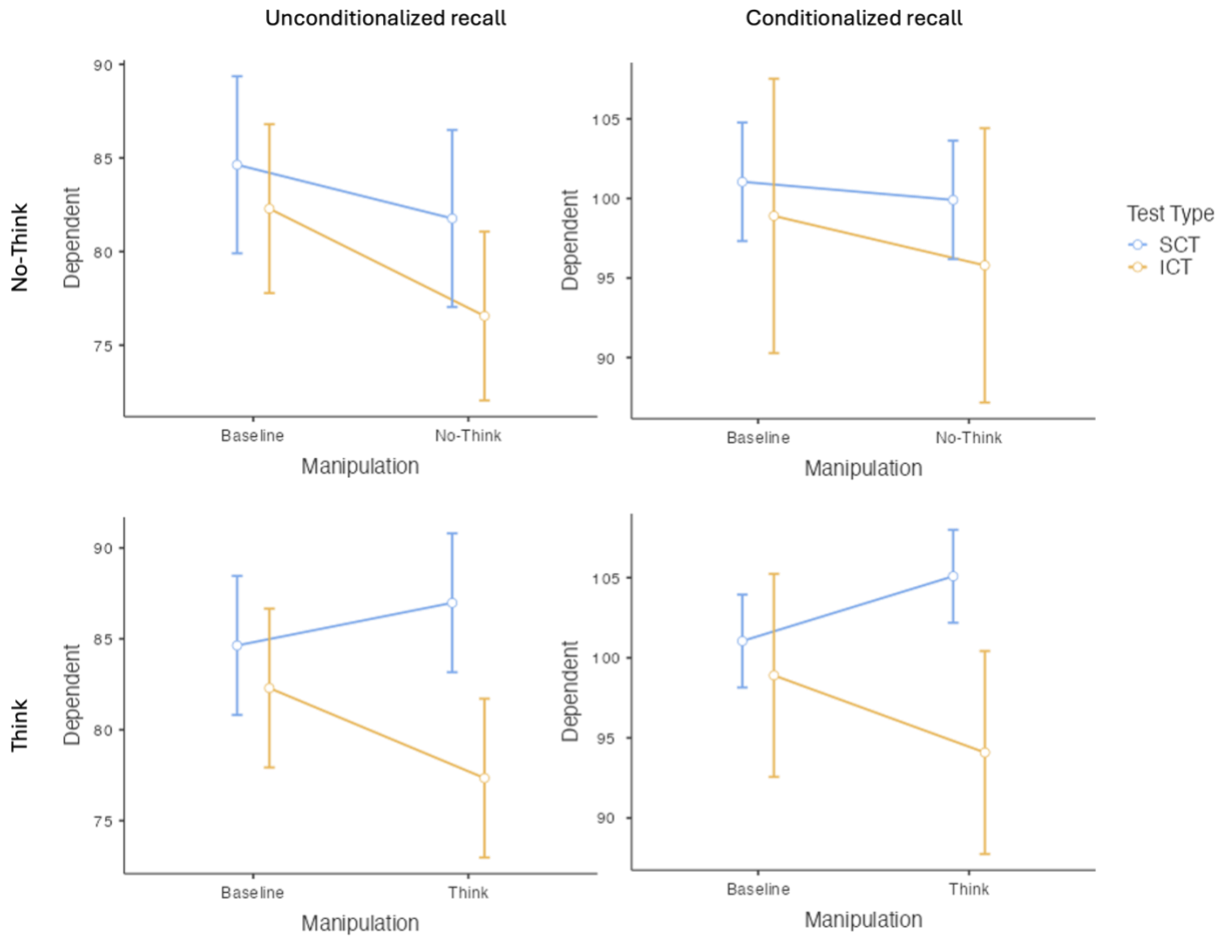
Results

The No-Think effect

The mean difference (Baseline minus No-Think) was $\Delta M = 4.29$ in unconditionalized and $\Delta M = 2.12$ in conditionalized recall. However, the suppression effect was not significant ($p = .078$) in unconditionalized as well as conditionalized recall ($p = .565$), see Figure P1 (error bars indicating confidence intervals). As a result, Hypothesis-P1 was not confirmed. There was no significant interaction between the suppression manipulation and within-subject factors (SCT and ICT). This signifies that the suppression effect, albeit non-significant, was consistent in terms of within-subject factors (SCT and ICT).

Figure P1

Marginal mean plots of No-Think and Think manipulations for both recall types.



The Think effect

There was no facilitation effect: the difference between the Baseline and Think conditions was not significant in both conditionalized and unconditionalized recalls (p = .548 and p = .879), therefore, Hypothesis-P2 was not supported. Interestingly, the Think manipulation had a marginally significant interaction with SCT and ICT (p = .063 in conditionalized and p = .070 in conditionalized recall), see Figure P1 (error bars indicating confidence intervals). With a closer inspection, there seems to be a pattern of increased recall with SCT (ΔM = 2.3 in unconditionalized and ΔM = 4.04 conditionalized recall) and decrease in recall with ICT (ΔM = -

4.95 in unconditionalized and ΔM = -4.81 conditionalized). Despite not finding the evidence of facilitation effect, a diverging trend in Think effect due to different types of testing was interesting and warranted further testing.

YBOCS and PCLC as covariates

Participants scored over the continuum of these scales and no outliers were detected. When used as covariates in separate analyses, none of them changed the previous conclusions. A moderate significant correlation (r = .59, p = .003) was detected by YBOCS and PCLC suggesting that some participants scored simultaneously high or low on both scales.

Pooled analyses 2 (for the pilot study)

Given that participants in the pilot project, and Lo YBOCS and Lo PCLC from the main study could share an effective suppression capability and there were no statistical reasons to infer otherwise, we pooled their data to explore the suppression and facilitation effects in general. We found that the suppression effect was more pronounced in both unconditionalized (ΔM = 4.78, p = .006, , η_p^2 = 0.06) and conditionalized (ΔM = 6.00, p = .009, η_p^2 = 0.05) recalls, whereas the Think effect was non-existent (p = .134 and .541). Yet, again, we had strong reasons to believe that the Think effect interacted with the test type in both recalls (p = .003 and .006) strengthening our prior dispositions that the Think manipulation yields a diverging effect in relation to the test type (i.e., an increase in Think recall with SCT and a decrease with ICT).

Pilot Study Discussion

The main aim of this pilot study was to replicate the No-Think suppression effect with 12 repetitions. Contrary to the first TNT study (Anderson & Green, 2001) that used 16 repetitions, a significant suppression effect due to a No-Think manipulation with 12 repetitions was not found. Therefore, Hypothesis-P1 was not supported. The difference between No-Think and Baseline

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was minimal with 12 repetitions compared to previous studies reporting 6% - 8% differences with different levels of repetitions (Levy & Anderson, 2008; Stramaccia et al., 2021). An important feature of No-Think manipulation, however, was no significant interaction between the types of testing (SCT and ICT). This means whether one used SCT or ICT, the outcome of No-Think suppression would likely be the same.

In addition, there was the absence of a No-Think suppression effect despite controlling for trait scores in the pilot study. Based on the executive deficit hypothesis (Levy & Anderson, 2008), those at the lower end of trait scales (YBOCS and PCLC) should demonstrate a more effective suppression capability.

The Think manipulation did not result in a facilitation effect. Therefore, Hypothesis-P2 was not supported. Importantly, however, there was a marginally significant interaction of test type (SCT and ICT) with the Think manipulation. Only the SCT showed an increase in recall due to the Think manipulation. It might be that the SCT and ICT could involve different processing mechanisms in the brain. This also warranted further investigation. The main study was purposely designed to address the mentioned issues and has explored these diverging effects with greater detail.

Furthermore, the Pooled Analysis 2 (Pilot study + Lo YBOCS + Lo PCLC) also confirmed the suppression effect of No-Think manipulation. This shows that the No-Think suppression effect can be achieved with a sufficiently large number of participants. The difference between Baseline and No-Think trials was consistent with previous studies that have reported a difference of 6-8% (Levy & Anderson, 2008; Stramaccia et al., 2021). Our findings contrast with (Anderson & Green, 2001; Depue et al., 2007; Hulbert et al., 2016) who reported a suppression effect with n = 24 or fewer participants, whereas n = 24 was perhaps not a sufficient

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sample size to demonstrate a significant suppression effect based on the current findings. Nonetheless, the present findings confirm that the No-Think suppression effect can be replicated with the use of direct-suppression to actively suppress unwanted memories, resulting in a declined recall following the No-Think manipulation.

This also indicates that the Pilot Study had a very small sample size, and therefore, the suppression-induced forgetting effect was not replicated. As discussed in the main study, it is not uncommon to require a very large number of participants for such studies (e.g., Liu et al., 2021). Considering the Pooled Analysis 2 along with pilot study, it is further supported that the suppression-induced forgetting effect a trade-off between sample size, number of repetitions, and number of stimuli, consistent with Nardo and Anderson (2024).

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